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# **A Novel Pedagogical Approach to Teaching Climate Change and Ethics**

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## **Abstract**

Climate change is not only a political, economic, and social crisis, it presents one of the great moral problems of our time. This paper describes an introductory course that describes the science, policy, and ethics of climate change. This course uses the novel pedagogical approach of integrative studies to provide students the tools to understand the basic science of climate change and its ethical implications. Students will come away with a better sense of the moral dimensions of this phenomenon and the implications for human civilization and for the biosphere. Integrative studies courses are co-listed in two education domains, which serve to give students a broader perspective than a single domain course. This course is co-listed in the domains of general sciences and humanities.

As a general sciences course, students must be able to explain the methods of inquiry in the various climate science fields; demonstrate informed understandings of scientific claims and their applications; and evaluate the quality of the data, methods, and inferences used to generate scientific knowledge about climate change. Students will demonstrate their mastery of these concepts through participation in class discussion, acceptable achievement on quizzes and homework and on the first unit exam.

As a general humanities course, students must be able to explain the methods of inquiry in ethics, demonstrate competence in critical thinking about topics such as human interaction with nature and the value of human and ecological flourishing, and critically evaluate class texts, especially their ethical dimensions. Students will demonstrate their ability to incorporate the knowledge of climate science into an ethical analysis through homework assignments and through conducting and reporting on an ethics conversation.

Integrative learning objectives will be emphasized throughout the class, but a final climate negotiation project will allow students to apply their knowledge of climate science and ethics to a specific country context. Together, teams of students will engage in a mock climate negotiation in the final week of class.

## 1 Introduction

### 1.1 Course structure

Students who enter this course come from a variety of backgrounds and majors, as well as a variety of college standing (1<sup>st</sup>-8<sup>th</sup> colligate semesters). Some students are first semester freshmen, while others are seniors completing their final course requirements. This course gives students a basic understanding of energy and energy usage as well as engaging with current questions about climate, weather and climate change through the lens of ethics. As students come from a variety of backgrounds, both in college coursework/preparation and in science literacy, it is a challenge to engage the entire class in discussion and dissection at a sufficiently challenging yet not unreachable level. In order to meet this challenge, I approach the course from the perspective of scientific inquiry, based on Harwood (2003). By initially introducing the class to the scientific inquiry process, I provide students a framework with which to fit existing knowledge and to place new knowledge. The central graphic for the course is the wheel of scientific inquiry, shown in Figure 1.



Figure 1: Activity model for scientific inquiry

Similarly, the coursework is structured such that it follows the wheel of scientific inquiry through the progression of course topics. The course begins by exploring the observations we have made with respect to weather and climate, for example, by asking students to research an extreme weather event and present their findings in the form of a discussion post or course presentation. Through this lens, students are invited to consider the relationship between these events and changing climate. Once they begin to see the linkages between current events and the larger picture of climate change, they are asked to think about what we know and what might be responsible for this, leading to the second focus of the course on ethics. Students then “investigate the known” by learning about energy and energy usage from a global perspective, then narrowing to the national picture, then narrowing further to the local energy portfolio. By starting students with the global perspective, it helps them to place their learning in context.

A similar pathway is followed for all ethical discussion. Students are invited to read a paper by Greg Jenkins which details the prediction and effects of Hurricane Fred in 2015. The conclusion of the paper outlines

lessons learned following the devastating hurricane on Cape Verde, which include challenges in communication and preparedness given the diverse socioeconomic population of the island. Students are asked to discuss the ethics involved in effective communication, both before and after extreme weather events and to consider the implications of ethical behavior. In this way, students both “observe” and “reflect on the findings.”

## **2 Projects**

### *2.1 Project focus: Living Room Conversations*

To bring together student learning about climate change and ethics, students engage in Living Room Conversations using the summary for policy makers from the latest IPCC report. A Living Room Conversation bring together between four and six individuals (ideally six) to host a meaningful conversation about an issue, where the focus is learning from one another and being open and curious, rather than debating the issue. Two students serve as hosts and each invites two other individuals to be part of the conversations. Living Room Conversations can take place anywhere, including via virtual tools like Zoom. The hosts come up with 2 well-researched facts and 5 open-ended, inclusive questions that they want to know the answer to that can lead into the relationship between people's values and thoughts about climate change. Some of these questions can be detailed, but there should be at least 2 large-scale open questions. To begin the conversation, students start with start with open discussion about their values before concentrating on climate. For the facts, students are required to cite peer-reviewed publications, using the IPCC summary as a jumping off point. The Living Room Conversation is an open-source, non-profit project that was founded in 2010 with the aim of create a structured, intimate conversation format that would empower everyday citizens to discuss important issues with friends of differing political affiliations and backgrounds. The theory was that if two friends with different points of view, each invited two friends to join a conversation, with full disclosure about the intent and structure of the conversation, they could create a safe space for a respectful and meaningful exchange of ideas, develop new relationships and perhaps find common ground. Students utilize the Living Room Conversations as a way to synthesize their learning of both climate and ethics while engaging others in discussion. Student feedback related to this portion of the course included the important reflection: “I also liked that she had us doing this type of hands on activity in class. I feel that because she did that it made it much more fun to learn.” Students rated the effectiveness of the course in stimulating further explorations of the subject matter outside of class as 6.63 on a 1-7 scale, indicating that this activity was effective.

### *2.2 Final project: Mock Climate Negotiation*

The final for the course is a mock climate negotiation. Based on the Paris climate negotiations, students organize themselves in groups of four or five to represent a country that is not the United States. This exercise takes place in over two class sessions. During the initial session, students are reconfigured into five groups, so that all the ministers of culture are sitting together, all the ministers of environment, the ministers of energy, foreign ministers, and industry reps. The goal for this session is to have an open discussion without the pressure of negotiation. Each country presents its particular situation regarding energy, culture, etc. and then they should talk about 1) what useful information is missing about their country, and 2) how their particular portfolio intersects with carbon reduction goals for their country. The

purpose here is to mimic the actual international process by which countries prepare for international organizations. To prepare for these negotiations, students complete and submit a short research paper of approximately 900 words. The subject of the research paper will depend on a) the chosen country and b) the students' administrative "portfolio." The job of the student is to understand their country's commitments under the Paris accord and how they fit into that country's overall goals. In other words, students are trying to understand what each country thinks are economically viable, technically feasible, and ethically important. For example, if a student chooses to represent the energy minister for China, they will want to know China's energy needs, current mix of energy production, and specific plans for renewable energy in the future. The research paper should include authoritative data from peer-reviewed sources (such as the IPCC reports) as well as analysis of those data. Following this class session, the mock negotiation is held. Each delegation is allowed 1-5 minutes (as determined by the moderators) to present a poster with its three main goals for the negotiation. The moderator will invite responses to the stated goals from other delegations; only those recognized may speak. Following presentation, students expected to engage in bilateral and trilateral negotiations with representatives from the other countries. Together they must join with other countries to generate a PowerPoint slide or two, which details how they intend to reach their CO<sub>2</sub> reduction goals and justifications. Following creation of these slides, students sit in their multi-country blocs and present the results of multi-lateral negotiations. Delegations are allowed 1-5 minutes (as determined by the moderator) to present their PowerPoint slides. After the first presentation, non-represented countries will vote either to discuss or to move on to the next presentation. At any time, points of conflict will be identified by the moderators and resolved using the Indaba Technique: "huddles" will be established by naming representatives who will discuss (others may join and observe, but may not speak). Objections must include positive alternatives. At the close of negotiations, results are binding and a new "accord" is generated. This exercise is a great close of the course as students must utilize their learning of both climate and ethics along with civil discourse to follow a dialogue that mirrors real world processes. Student feedback included the important quote : "The final climate negotiation helped me to really understand the positions of each country and how climate change affects everyone." Students rated the effectiveness of the course in improving critical thinking skills as 6.50 on a 1-7 scale, indicating strong agreement with the evaluation statement.

### **3 Conclusion**

This paper presents a brief outline of a novel pedagogical approach to teaching climate change and ethics through an integrative studies course. Students use the wheel of scientific inquiry to fit existing knowledge with new knowledge to broaden their understanding of topics in both climate and ethics. As part of the course, students synthesize their learning through two major projects; a mid-semester Living Room Conversation and the final climate negotiation. This approach is unique in pedagogy by providing students with the tools to explore the moral dimensions of climate change and the implications for human civilization and for the biosphere.

### **References**

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